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ABSTRACT

A New Jersey study identified aptitude and personality traits of secondary male students who elected nontraditional career-related programs in vocational education. The sample of 182 eleventh- and twelfth-grade students included males enrolled in nontraditional subject areas, females from these same program areas, and males enrolled in traditional vocational programs. Data collection instruments were the Differential Aptitude Test (DAT) and the Strong Campbell Interest Inventory (SCII). Data were analyzed using the t-test and the General Linear Models procedure for unbalanced analysis of variance as outlined in the Statistical Analysis System. Results showed that male students who elected nontraditional vocational subjects scored higher in language usage and lower in space relations on the DAT than did the traditional male students. Nontraditional males scored significantly lower in the realistic type on the SCII and significantly higher in the social, conventional, enterprising, and artistic types. No significant differences were found in aptitude between males and females on five of seven subparts of the DAT. No significant difference was found in personality scores between males and females, except for the realistic type. There were significant differences in DAT scores among males in the three different programs but none in SCII scores. (Study materials are appended.) (YLB)

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FINAL REPORT OF

FACTORS INFLUENCING THE ELECTION OF NONTRADITIONAL VOCATIONAL PROGRAMS BY HIGH SCHOOL MALES

1980-1983

Doris L. Dopkin
Project Director

U.S. DEPARTMENT OF EDUCATION
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FORWARD

The study reported in this paper builds upon work which was discussed in FACTORS INFLUENCING THE ELECTION OF NONTRADITIONAL VOCATIONAL PROGRAMS BY HIGH SCHOOL MALES, PART I - RELATED LITERATURE AND PROCEDURES, ERIC document, ED 206-892. For purposes of clarity and comprehension of the work here reported, some of the information from the preliminary study will be repeated. The preliminary study was, in part, conducted pursuant to a contract with the New Jersey Department of Education, Division of Vocational Education and Career Preparation, funded under Section 131 of Public Law 94-482.

This work formed the basis of a dissertation entitled OCCUPATIONALLY RELATED APTITUDES AND PERSONALITY TRAITS OF MALE STUDENTS ENROLLED IN NONTRADITIONAL VOCATIONAL PROGRAMS which was submitted to the Graduate School of Education, Rutgers, the State University of New Jersey, 1983.

TABLE OF CONTENTS

		Page
FORWARD.		ii
LIST OF TABLES		vi
Chapter		
I.	INTRODUCTION	1
	The Problem	6
	Purpose of the Study	8
	Hypotheses	8
	Assumptions	10
	Limitations of the Study	11
	Definition of Terms.	12
II.	REVIEW OF LITERATURE	13
	Nontraditional Program Areas	14
	Home Economics	14
	Health Occupations	15
	Business and Office	17
	Personality and Aptitude	18
	Personality	18
	Aptitude	22
	Other Career Influences	24
	Parental Influence	24
	Socioeconomic Level	26
	Experiences	27
	Conclusions	27
III.	METHOD	29
	Research Design	29
	Sample	30
	Data Collecting Instruments	35
	Strong Campbell Interest Inventory	35
	Differential Aptitude Test	37
	Data Collection	39
	Data Analysis	40

TABLE OF CONTENTS--Continued

Chapter		Page
IV.	PRESENTATION OF FINDINGS AND DISCUSSION	42
	Hypothesis 1	42
	Hypothesis 1a	43
	Findings	43
	Hypothesis 1b	45
	Findings	46
	Discussion	46
	Hypothesis 2	49
	Findings	49
	Discussion	54
	Hypothesis 3	54
	Findings	55
	Discussion	59
	Hypothesis 4	63
	Findings	63
	Discussion	68
	Hypothesis 5	69
	Findings	70
	Discussion	74
	Hypothesis 6	75
	Findings	75
	Discussion	77
	Other Findings	79
	Parental Influence	79
	Introductory Vocational Experience	80
	Previous Job Experience	82
	People Influencing Students' Choices	82
	Summary	85
V.	SUMMARY	88
	Procedures	90
	Sample	90
	Data Collection Instruments	91
	Data Collection	92
	Data Analysis	92
	Findings	93
	Implications for Education	96
	Implications for Future Research	98

TABLE OF CONTENTS--Continued

	Page
REFERENCES	100
APPENDICES	
A. COVER LETTER	106
B. SELECTION OF STUDENTS	110
C. PERMISSION FORMS	114
D. BACKGROUND INFORMATION SHEET	119
E. TESTING INSTRUCTIONS	121

LIST OF TABLES

Table		Page
1.	Number of Students in Each Subject Category	33
2.	Means and Standard Deviations of Traditional and Nontraditional Males on the Aptitudes of Language Usage and Clerical Speed and Accuracy	44
3.	Means and Standard Deviations of Traditional and Nontraditional Males on the Aptitude of Space Relations	47
4.	Means and Standard Deviations of Traditional and Nontraditional Males on the Aptitudes of Verbal Reasoning, Numerical Ability, Abstract Reasoning, and Spelling	50
5.	Means and Standard Deviations of Traditional Males on Measures of Personality Types	51
6.	Analysis of Variance of Subparts of the Differential Aptitude Test by Course and Sex	56
7.	Duncan's Multiple Range Test for Course Differences on Subparts of the Differential Aptitude Test	60
8.	Analysis of Variance of Strong Campbell Interest Inventory Scores by Course and Sex	65
9.	Duncan's Multiple Range Test for Course and Sex on the General Occupational Themes of the Strong Campbell Interest Inventory	66

LIST OF TABLES--Continued

Table		Page
10.	Analysis of Variance on Measures of Aptitude for Male Students in Home Economics, Health Occupations and Business and Office.	71
11.	Duncan's Multiple Range Test on Measures of Aptitude for Male Students in Home Economics, Health, and Business and Office	72
12.	Analysis of Variance on Measures of Personality Types for Male Students in Home Economics, Health Occupations and Business and Office.	76
13.	Means and Standard Deviations for the Realistic Subpart of the SCII by Course and Sex.	78
14.	Percentage of Students by Category Who Had an Exploratory Vocational Experience	81
15.	Number and Percent of Nontraditional Males Responding in Each Category to the Person Influencing Their Decision to Elect a Vocational Program.	84

CHAPTER I

INTRODUCTION

Throughout history, tasks and roles have been assigned to men or women on the basis of that which each seemed best equipped to handle. Those tasks which required strength were done by men, and those which related to child bearing and the home were the responsibility of women. Vocational education developed along these traditional lines in order to meet the needs which were reflected by the society. Manual training programs were designed to meet the needs of a growing industrial nation and to train men in the skills which they needed to be productive workers. Women's needs were addressed in home economics programs which were designed to provide women with the skills needed for efficient homemaking. The trend toward a decentralization of work away from the home meant that families were scattered during the day to schools and factories. Girls no longer gained the skills they needed for their roles as homemakers from their mothers, and boys could no longer learn the necessary trade skills from their fathers. Thus, formal education became increasingly important in the preparation of people for jobs and home life, and vocational education in the United States developed along appropriate sex lines.

This traditional approach to vocational education met the needs of the people during the past century, and the first half of this century. However, the evolutionary process of society has continued, and the sex appropriateness of specific jobs and education is becoming obsolete. Dobbert (1975) argues that sexual task differentiation is not necessarily useful for survival in the machine age. Changes have taken place in our society which have resulted in changes in the world of work and in a need to re-examine the goals of vocational education as they relate to sex appropriateness of course assignment. Physical strength is no longer a primary requirement for most jobs, and the home production of goods and services has largely been replaced by business and industry. Women have increasingly entered the paid labor force, thus causing a blurring of traditional roles and changes in family functions. As a result, there has been an intense interest in the needs of women in all of the areas of vocational education as the schools try to prepare women adequately to enter a wide variety of occupational areas. It is important to make these changes not only to meet the changing needs of women, but also to meet the needs of industry for skilled and productive workers.

However, it must be acknowledged that the changes in society are also impacting on men. In the past, men have also been limited in their career choices to those areas

which were considered appropriate for males. Yet, recent Civil Rights legislation (1972) and mandated affirmative action programs are increasing pressures on industry to hire men for traditionally female employment areas. This is especially true in the area of business and office practices. Men who express interest in jobs which are related to the helping careers, such as health occupations at the introductory level, face the same stigmas and social pressures which women face when they select nontraditional careers. These pressures are also felt by men who choose careers, such as those represented by the home economics related occupations.

Recent studies (Durkin, undated; Maccoby & Jacklin, 1974) of differences do not find differences in skills between men and women which are great enough to cause the dichotomy of career areas to specific sexes. Durkin (undated) reports on a series of studies done at the Human Engineering Laboratory of the Johnson O'Connor Research Foundation involving the measurement of 22 aptitude and knowledge areas. He found that there were no sex differences in 14 of the areas; women excelled in six, and men excelled in two. The study concluded that, "There is no field which can, with absolute assurance, claim to be the exclusive domain of either sex." In fact, Maccoby and Jacklin (1974) conclude that the differences seem to be greater within the sexes than between the sexes.

Much has been written about the negative effects of sex role stereotyping on women. However, there are also some indications that the forcing of people into perceived sex appropriate roles has had some negative effects for men as well. For example, Gray (1957) found that males who scored high in sex stereotyped behaviors and attitudes also scored higher on measures of anxiety. Dweck and Bush (1976) and Farrell (1974) found that it is more acceptable for females to express fears, anxieties, tenderness, and weaknesses than males. Men, as well as women, have been found to experience conflict between their ideal self and the stereotyped characteristics generally associated with their sex (Peck, 1976). It seems to be more difficult for males than females to unlearn stereotyped behaviors (Farris, 1977; Mussen, 1962). Several studies found negative effects of stereotyping in the elementary years. According to Sadker and Sadker (1981), boys are more likely to be scolded in the classroom even when their conduct did not differ from that of the girls, and more likely to be identified as having learning disabilities, to receive lower grades, and to be grade repeaters. During these elementary years, males are also referred to clinics for psychological and behavioral problems with greater frequency than females (Rosenkrantz et al., 1968). These elementary school years seem to be a time when the impact of developing sexuality and stereotyping causes conflict in young males related to self-image and sex appropriate behavior.

Some of the negative effects of stereotyping have specific implications for vocational education. For example, there are indications that pressures to conform to a sex role are stronger for men than for women (Mussen, 1962; Rosenkrantz et al., 1968; Whiting, 1963). It has been suggested by a number of writers that teachers and counselors contribute to these pressures by advising boys to enter sex stereotyped careers, thus limiting their consideration of careers, such as secretary, nurse, or kindergarten teacher (Dixon, 1976; Frazier & Sadker, 1973; Pleck & Bannon, 1978). If this information is coupled with the research which suggests that there is a direct connection between perceived sex roles and career choice (Beur, 1974; Hewitt, 1975; Looft, 1971), it is easy to suggest that career selection will continue along specific sex lines as long as the pressures to conform to a stereotype are strong.

Concern for the limitations which have been placed on people because of the differences in the treatment of boys and girls has been addressed in several laws. Discrimination on the basis of sex in educational programs or activities which receive federal financial assistance was prohibited by Title IX of the Educational Amendments of 1972. Title IX is aimed at all educational programs. Sex discrimination is defined in this law as, "any action which limits or denies a person or a group of persons opportunities, privileges, roles, or rewards on the basis of their

sex." Because of the importance of this topic for vocational education--one of the most sex segregated areas within the educational system--the elimination of sex bias and sex stereotyping has been designated as a priority area for vocational education in the Educational Amendments of 1976. The Educational Amendments of 1976 define sex bias as, "behaviors resulting from the assumption that one sex is superior to the other." Since sex role perceptions are acquired characteristics (Women on Words, 1972), it is not surprising that the educational system in the United States has been charged with the task of attempting to eliminate the biases which unnecessarily restrict people to limited career choices.

The Problem

Mandates, good intentions, and the knowledge that a problem exists are not enough to bring about change. People's values are deeply involved in stereotyping. If people are to conduct themselves in new ways, they must go through a learning process in order to build a base of understanding relating to the acceptance of new values. Part of this process must include an understanding of the underlying factors which work to influence students' choices in career areas. Much work has already been started to address this issue. Course titles, course descriptions, and educational materials have been revised. Many publishing companies are working to eliminate the

sexism and the racism in textbooks and other educational materials (Macmillan Publishing Company, 1975; McGraw-Hill Book Company, undated; Scott, Foresman & Company, undated). Research has been conducted to study some of the concerns in this area. However, most of the work which has been done has been related to women's needs. Very little work has been done on the reverse situation--the studying of the needs and responses of men in the subject areas which have been considered traditionally female. A recent study by Vetter, Sechler, Lowry, and Canora (1979) in a review of the factors which influence nontraditional enrollments in vocational education, found only three studies which related specifically to male students in nontraditional vocational programs. Thus, it would appear that the study of males in nontraditional vocational areas is fertile ground for research.

How then are male options in vocational education increased? A base of knowledge about the characteristics of the students in vocational education must be developed. Comparisons have been made between students who are enrolled in vocational and other educational programs, between males and females within vocational education, and between females enrolled in traditional and females enrolled in nontraditional vocational programs. It is time now to compare the male students who elect nontraditional programs with those students who elect traditional programs to identify

similarities and differences. The identification of these characteristics can be used to provide improved career counseling which, in turn, can help to increase career options for males. This should be a step forward in the elimination of the sex-linked images of specific vocational programs.

Purpose of Study

It was the goal of this project to identify some of the characteristics of male students who elected nontraditional career related programs in vocational education at the secondary level. The specific characteristics examined were personality types as indicated by the general occupational themes which were measured by the Strong Campbell Interest Inventory, and aptitudes as measured by the Differential Aptitude Test. Specifically, this study attempted to identify some of the aptitude and personality characteristics of male students who have enrolled in vocational subject areas which were by tradition and enrollment, primarily female subject areas. These areas were home economics related occupations, health occupations, and business and office programs.

Hypotheses

The following hypotheses were used as the basis of this study.

1. There will be significant differences ($p < .05$) in aptitudes, as measured by the subparts of the Differential

Aptitude Test, between male students who elect nontraditional vocational subjects and male students who elect traditional vocational subjects. Specifically:

a. Male students who elect nontraditional vocational subjects will score higher than male students who elect traditional vocational subjects ($p < .05$) in the aptitude areas of language usage and clerical speed and accuracy.

b. Male students who elect nontraditional subjects will score lower than male students who elect traditional vocational subjects ($p < .05$) in the aptitude area of space relations.

2. Male students who elect nontraditional vocational subjects will score significantly different ($p < .05$) than male students who elect traditional vocational subjects on personality types, as measured by the Strong Campbell Interest Inventory.

3. There will be no significant differences in aptitude ($p < .05$) for the separate scores of the subparts of the Differential Aptitude Test, between males and females enrolled in the areas of home economics related occupations, health occupations, and business and office programs.

4. There will be no significant differences in personality scores ($p < .05$), as measured by the Strong

Campbell Interest Inventory, between males and females in home economics related occupations, health occupations, and business and office programs.

5. There will be no significant differences in aptitude ($p < .05$) as measured by the subparts of the Differential Aptitude Test, among the male students who elect home economics related occupations, health occupations, and business and office programs.

6. There will be no significant differences in personality types ($p < .05$) as measured by the Strong Campbell Interest Inventory among the male students who elect home economics related occupations, health occupations, and business and office programs.

Assumptions

The following assumptions were basic to this study:

1. The election of a vocational program by the student was taken as an indication of an interest in that specific area as a possible career choice.

2. It was assumed that each respondent answered the questions honestly and to the best of his or her ability.

3. Vocational interests are an expression of personality and therefore, vocational interest inventories can be used to measure personality types.

Limitations of the Study

This study was limited to the number and the characteristics of the nontraditional male students who were found in each of the vocational programs. A cosmetology subsample had to be dropped from the study because only one high school male was found in this category. In the health occupations area, only 16 males were found for testing. Since this number seemed to represent more than half of the total student population in this category in New Jersey, and since it was one subject over the minimum number of 15 subjects needed for testing (Borg & Gall, 1979), the health occupations students were included in the project.

Another major limitation of the study involved health occupations students. More than half were minorities--black and hispanic--from urban schools. For some, English was a second language, the reported reading scores on statewide tests were below grade level, and family income was listed as lower than the average New Jersey family income. For these reasons, there was some question about the validity of using this group of students to represent high school male health occupations students in general. However, the question might also be raised as to why these students seemed to make up the bulk of the male health occupations students in New Jersey. In the home economics and business areas, minority students were a part of each

sample, but did not comprise the majority of students tested, as was the case in the health occupations area.

Definition of Terms

1. Nontraditional Student refers to male students who elected a vocational program with a predominately female enrollment. Specifically, this refers to home economics related occupations, health occupations, and business and office programs.

2. Traditional Student was a male student who elected a vocational program with a predominately male enrollment (those programs found in trade and industry) or a female student who elected a vocational program with a predominately female enrollment.

3. Aptitude refers to the skills and abilities which students need to help them succeed in the world of work. The specific aptitudes which were measured by this study included: verbal reasoning, numerical ability, abstract reasoning, clerical speed and accuracy, space relations, spelling, and language usage. All of these were measured by the Differential Aptitude Test.

4. Personality Type as used in this study refers to the personality types related to vocational preferences or general occupation types as described by Holland (1973). These included: realistic, intellectual, social, conventional, enterprising, and artistic as measured by the Strong Campbell Interest Inventory.

CHAPTER II

REVIEW OF LITERATURE

Intense interest has been focused on the inequities within the vocational education system related to the topics of sex bias and sex stereotyping since the passage of the Educational Amendments of 1976. This legislation states that

> It is also the purpose of this part to authorize Federal grants to States to assist them...(3) to develop and carry out such programs of vocational education within each State so as to overcome sex discrimination and sex stereotyping in vocational education programs (including programs of homemaking), and thereby furnish equal educational opportunities in vocational education to persons of both sexes.

Interest in this topic has resulted in a large number of publications related to sex bias and sex stereotyping in vocational education. However, most of these writings have dealt with women in the nontraditional vocational areas rather than men in nontraditional areas. Many of the writings which do deal with men tended to be based on informal observations and experiences and related to methods of recruitment and curriculum adaptation (Dopkin, 1978; Smith, 1975). Some studies have used men as a base of comparison from which to study the characteristics of women. Other studies have taken a broad approach and

have included both males and females (Indiana State Board of Vocational and Technical Education, 1977; Richards, 1979; Sawyers, 1978).

Thus, when studying men in nontraditional vocational areas, it becomes necessary to look at a wide variety of sources and try to extrapolate information from general research about career choice, research which used men as a basis for comparison of the study of women, and from the research related to sex differences. All of these types of studies were used to provide the theoretical basis for the hypotheses used in this study.

Nontraditional Program Areas

Only a few studies were found which related to the specific nontraditional vocational areas under study.

Home Economics

There have been studies in the home economics area which have dealt with the place of men in the curriculum. However, these studies appear to deal more with curriculum rather than the students themselves. For example, Kohlmann (1975) used research findings and theory related to the characteristics of the adolescent male to develop a teaching guide for young men in home economics.

Weis (1979) evaluated curriculum materials which were used in home economics programs and found them to be sex stereotyped. The textbooks were actually saying more about

females, but using more masculine pronouns to say it. On the other hand, males were underrepresented inside the home and in occupational roles, females were over-represented in these areas. Females also received more role direction than did the males. The message to the students in these textbooks was that home economics was for girls, not boys.

Conti (1981) dealt with sex role attitudes rather than curriculum. She used the Bem Sex-Role Inventory to study differences in sex role perceptions of high school males related to the election, nonelection, and completion of consumer and homemaking courses. She found that there was a relationship between the completion of home economics courses and more androgenous personality ratings. This indicated that there was a relationship between course work and positive attitudes toward equality of sex roles.

No studies were found which dealt specifically with the reasons why males elected programs in the home economics related occupations area.

Health Occupations

The studies in the health occupations area were limited to ones which focused on subjects at the college or post-secondary level. They are reported here because of their application to factors which influenced males to elect careers in the nursing field.

An interesting study conducted by Auster and Auster (1970) related to the recruitment of men into the nursing field. A cross-sectional attitude survey of both beginning and advanced nursing school students found that the men in the study viewed themselves as superior to the women, placed less value on hard work, and were poorer students in high school. The authors recommended the following recruitment strategies for men: recruiting in lower socioeconomic areas, small towns, and in rural areas by male recruiters; and appealing to men by stressing professionalism, leadership, administration, science and technology. It is interesting to note that this appeal was different than the usual appeal toward women entering this field or "helping" profession. Perhaps this was a reflection of the time period in which the study was conducted.

Hecht (1980) also addressed the recruitment of males into the nursing field. She suggested that recruitment efforts should be directed at men whose personality types resemble Holland's social and investigative types. Women, however, were twice as likely to have the social type as their highest area, while men were more likely to have the investigative type as their highest category. The men in this study also showed a proportionately higher incidence of having the realistic category in first position. Blacks and men in her study were found to be lower on the social class scale than whites or women.

Business and Office

Hurd and Allred (1978) studied the interests in and the attitudes toward secretarial positions of 360 eleventh grade male students in Rhode Island. They found that the students were either undecided about their feelings towards males as secretaries, or were slightly in favor of males as secretaries. However, most of the male respondents showed a lack of interest in actually becoming secretaries. This seems to confirm work done by Burlin (1976) which found that innovative or nontraditional career choices were made significantly more often as an ideal aspiration than as a real aspiration.

Dixon (1976) sought to determine whether office occupations courses appeal to men if the curriculum is changed to better attract and train them. Of the respondents, 75% showed interest in the area, yet only one of the respondents had been counseled to consider nontraditional enrollment. Perhaps if more information was available about aptitudes and interests related to success in nontraditional areas, guidance practices could be improved.

These studies indicated a general reluctance on the part of males to consider careers in the business and office area. This reluctance helps to explain why only about 1% of the people employed in the business and office area are men. This pattern prevails even though some companies, such as American Telephone and Telegraph, are

actively recruiting men for these positions (Terrone, 1978).

Personality and Aptitude

Since this study was concerned with the differences in the characteristics of males in the nontraditional vocational programs in New Jersey public schools, the research discussed in the following section was confined to those characteristics under study. The discussion does not include the effectiveness of specific guidance or recruitment techniques, the societal causes of stereotyping, or the effectiveness of specific curriculum content. It is concerned with two specific areas of interest: personality characteristics as defined by occupational interest and aptitude.

Personality

Holland (1959) proposed a theory of personality types based on the idea that vocational interests are an expression of personality. He further suggested that vocational preferences could be used to determine personality types. Therefore, interest inventories could also be used as personality inventories. This theory was based on four assumptions (Holland, 1973):

1. In our culture, most persons can be categorized as one of six types: realistic, investigative, artistic, social, enterprising, or conventional. (p. 2)

2. There are six kinds of environments: realistic, investigative, artistic, social, enterprising, and conventional. Each environment is dominated by a given type of personality, and each environment is typified by physical settings posing special problems and stresses. For example, realistic environments are "dominated" by realistic types of people--that is, the largest percentage of the population in the realistic environment resembles the realistic type. (p. 3)

3. People search for environments that will let them exercise their skills and abilities, express their attitudes and values and take on agreeable problems and roles. Realistic types seek realistic environments, social types seek social environments, and so forth. (p. 4)

4. A person's behavior is determined by an interaction between his personality and the characteristics of his environment. If we know a person's personality pattern and the pattern of his environment, we can, in principle, use our knowledge of personality types and environmental models to forecast some of the outcomes of such paring. Such outcomes include choice of vocation, job changes, vocational achievement, personal competence, and educational and social behavior. (p. 4)

Holland further suggests that in order to estimate a person's personality pattern that a person's scores can be used on selected scales from interest and personality inventories, such as the Strong Campbell Interest Inventory.

The extreme model of each of Holland's six types can be described as follows (Campbell, 1977):

Realistic: Persons of this type are robust, rugged, practical, and physically strong; somewhat uncomfortable in social settings; have good motor coordination and skills but lack verbal and interpersonal skills;

usually perceive themselves as mechanically and athletically inclined; are practical, stable, natural, and persistent; prefer concrete to abstract problems; see themselves as agressive; have conventional, political and economic goals; and rarely perform creatively in the arts or sciences, but do like to build things with tools.

Investigative: This category includes those with a strong scientific orientation; they are usually task-oriented, introspective and asocial; prefer to think through rather than act out problems; have a great need to understand the physical world; enjoy ambiguous tasks; prefer to work independently; have unconventional values and attitudes; usually perceive themselves as lacking in leadership or persuasive abilities, but are confident of their scholarly and intellectual abilities; describe themselves as analytical, curious, independent, and reserved; and especially dislike repetitive activities.

Artistic: Persons of the artistic type prefer free, unstructured situations with maximum opportunities for self-expression; resemble investigative types in being introspective and asocial but differ in having less ego strength and greater need for individual expression, in being more impulsive, and in suffering more frequently from emotional disturbances; they are creative, especially in artistic and musical media; show aversions to problems that are highly structured or require gross physical skills; prefer dealing with problems through self-expression in artistic media; perform well on standard measures of creativity, and highly value aesthetic qualities; see themselves as expressive, original, intuitive, creative, disorderly, nonconforming, introspective, and independent.

Social: Persons of this type are sociable, responsible, humanistic, and religious; like to work in groups, and enjoy being central in the group; have verbal and interpersonal skills; avoid intellectual problem solving, physical exertion, and highly ordered activities; prefer to solve problems through feelings and interpersonal manipulation of others; enjoy activities that involve informing training, developing, curing or enlightening others; perceive themselves as understanding, responsible, idealistic, and helpful.

> Enterprising: Persons of this type have verbal skills suited to selling, dominating, and leading; prefer to be strong leaders; have strong drive to attain organizational goals or economic aims; tend to avoid work situations requiring long periods of intellectual effort; differ from conventional types in having a greater preference for ambiguous social tasks and an even greater concern for power, status, and leadership; see themselves as aggressive, popular, self-confident, cheerful, and sociable; generally have high energy level; and show an aversion to scientific activities.
>
> Conventional: Conventional people prefer well-ordered environments and like systematic, verbal and numerical activities; are usually conforming and prefer subordinate roles; are effective at well-structured tasks, but avoid ambiguous situations and problems involving interpersonal relationships or physical skills; describe themselves as conscientious, efficient, obedient, calm, orderly, and practical; identify with power; and value material possessions and status. (p. 31-32)

These characteristics have been associated with specific occupations. For example, the social personality type relates closely to vocational preferences, such as those represented by home economics related occupations and health occupations. Hecht (1980) used Holland's code and found support for the supposition that the characteristic personality type for nurses was social-investigative-artistic, with one of these categories being the high score of 90% of the respondents including the males.

It seems reasonable then to suggest that the male students who elect nontraditional vocational areas would have different personality traits than those male students who elect traditional male programs.

Aptitude

Aptitude is defined by Webster as the capacity for learning. Bennett, Seashore, and Wesman (1974) define aptitude as the ability to acquire knowledge or skills. Aptitudes vary from person to person and have been linked to the skills which are necessary to successful performance in specific vocational areas. Super (1957) describes a developmental approach in the analysis of vocational behavior. According to Super one of the factors which affect vocational behavior is the special aptitudes a person has. These aptitudes influence not only occupational choice, but also occupational attainment. Success in business and office practice has been related to high scores in verbal reasoning, numerical ability, clerical speed and accuracy, and spelling; success in machine shop has been related to aptitude in verbal reasoning, numerical ability, and abstract reasoning; successful performances in drafting and data processing correlate with high scores in space relations (Bennett et al., 1974). It appears then that students in different vocational preparation areas would score differently on the various aspects of aptitude tests.

A discussion of aptitude is not complete without a discussion of sex differences related to specific aptitudes. Maccoby and Jacklin (1974) in a review of research on sex differences found that girls have greater verbal ability,

and boys excel in visual-spatial ability and mathematical skills. Durkin (undated) looked at 22 aptitudes and knowledge areas and found that there were no sex differences in 14 of the items measured, but that men excelled in grip and structural visualization (visual-spatial ability). Grip was related to skills needed by construction workers, athletes, and weight lifters. Structural visualization seems to be central to the technical/ scientific professions. Women were found to excel in graphoria (a measure of clerical speed and efficiency needed for accounting and secretarial work), observation, silograms (a measure of memory useful in the acquisition of languages and professional terminology), and abstract visualization (the theoretical complement of structural visualization needed for banking, politics and writing). Based on these findings, Durkin suggested that, "Neither a girl, nor a boy ought to dismiss peremptorily from consideration any endeavor solely because it has been the preserve of the opposite sex" (p. 3) Both Maccoby and Jacklin, and Durkin conclude that there seems to be a greater difference within each sex than between the sexes in the ability to acquire knowledge or skills.

The question now arises, were these reported differences culturally induced in order to prepare boys and girls for sex appropriate careers, or did the students select vocational areas on the bais of their abilities to

succeed in the vocational area? If the first is true, it would account for the differences by sex in enrollment within the vocational areas. If, however, the differences are, in fact, greater within each sex than between the sexes, the difference in enrollment should not be as great as currently exists.

Other Career Influences

Aptitudes and personality were only two of the many factors which have been identified as career influences. Other factors included parental influence, occupation and education; family income level; and the student's work experiences. It was felt that these factors might influence the results of this study and so a summary of these studies follows.

Parental Influence

The effect of parental influence on career choice was documented by a number of researchers. Many of these studies related to women (Almquist & Angrist, 1970; Ginsberg, 1966; Kane, 1976). However, males were also influenced in their career choices by their parents. Lungstrum (1973) found that the fathers' occupations affected sons' occupational choices, and that male students were found to be more independent of friends' influence regarding occupational preferences and choices than were females. Lungstrum also found that teachers consistently are seen

as exerting a strong influence on occupational choice.

Dewinne, Overton, and Schneider (1978) studied 2,225 freshmen at North Texas State University to test Holland's hypothesis that parents' personality types foster similar offspring personality development. The results showed a strong recurring paternal influence in offspring personality development. The personality types were determined by classifying parental occupations according to Holland's three-letter codes. The findings indicated that paternal influence was much stronger than maternal influence, especially with their sons. Earlier, Holland (1973) had studied the parental influences on the vocational interest development in adolescent males and concluded that, "the greater the number of positive vocational interests the father has, the greater the number of son's total interests and the more likely the son's interests will be in the feminine vocational areas." Thus, a positive atmosphere toward a wide variety of career choices on the part of the father seemed to be correlated with the possibility of nontraditional vocational selection on the part of the sons.

Other studies support the relationship of parental influence and career choice. Church (1974) compared the career objectives of Wyoming secondary students with parental occupations and concluded that, "There is more identification in the boys' career objectives with their

fathers' occupations (both classification and career clusters) than between the girls' and their mothers'." Sawyers (1978) and Richards (1979) both found that role models, including parents, were influential in student career plans.

The theme which seemed to repeat itself throughout these studies was the large role which parents played in the career choices of their offspring.

Socioeconomic Level

A study of social class and the sex stereotyping of occupations by Albrecht (1976) reported a number of interesting findings. He used two indicators of social class: (1) the educational level of the respondent, and (2) the income level of the head of the household in the family. When these two indicators were looked at separately, the results were quite different. Educational level was significantly related to the degree of sex-stereotyping for each of the 15 occupations studied. The lower the respondent's education, the more likely he or she was to indicate that the occupation listed was only or more suitable for men or only or more suitable for women. The higher one's education, the higher the probability of reporting that the occupations were suitable for both men or for women. However, when income was treated as the indicator of social class, the results did not indicate a statistically significant difference in the degree to

which people sex-stereotyped occupations.

Experiences

Experiences were found to have a primary influence on career plans. Richards (1979) studied secondary students' views on occupational sex-stereotyping and found that experiences, including course experiences and work experiences, were stated most often as an influential factor in choosing a career. Research in Indiana in 1976 by New Educational Directions found that 44% of the respondents indicated that experience in courses and work experience were factors which influenced traditional career choice, while 59% indicated experiences as being related to nontraditional career choice. Thus, it appears that nontraditional work experiences are related to the selection of a nontraditional career and that traditional experiences are related to the selection of a traditional career.

Conclusions

The search of literature related to the enrollment of males in nontraditional vocational areas revealed that very little research attention had been given to this aspect of sex bias and stereotyping. Most of the work has been related to women's needs, not to the needs of men.

Some limited research has been done in specific subject areas. Much of this work has been related to the recruitment of men into these nontraditional areas, rather than looking at the characteristics of the people who elected these areas.

Hecht (1980) is one of the few researchers who looked at personality types in relation to men in a nontraditional field. Her finding that men in the nursing field followed the same Holland personality classification pattern as the women in nursing, led this researcher to feel that the nontraditional male high school students would also follow patterns similar to those of female students in the same courses, and that these patterns would be different from those of the traditional male students.

Super's (1957) belief that aptitudes influence occupational choice was the basis for the feeling that the aptitude patterns of the nontraditional males would be similar to their female peers. However, because of the difference in skills needed for success in the traditional areas, it was felt that the nontraditional males would score differently than the traditional males on measures of aptitude.

Studies related to parental influence, socioeconomic level and experiences provided the basis for the belief that there would be moderating variables which needed to be considered.

CHAPTER III

METHOD

Research Design

In order to investigate the problem, a causal-comparative method was used to compare eleventh and twelfth grade male students enrolled in nontraditional vocational programs with males enrolled in traditional vocational programs. The study also compared the non-traditional males with females in the traditonal vocational courses. Intact groups were used. Sex was the independent variable, nontraditional program was the treatment variable, and aptitudes and personality types were the dependent variables. The specific areas of comparison were personality types as measured by the Strong Campbell Interest Inventory, and aptitudes as measured by the Differential Aptitude Test.

Eleventh and twelfth grade students were selected for this study because this is the time in the high school program when the vocational aspect of the training becomes most intense, and is a time when serious thought is given to future goals in the job market. Super (1957) calls this the exploration stage of vocational development: a time of tentative choices for occupational exploration based on needs, interests, capacities, values and

opportunities.

Both traditional female and traditional male students were selected as a basis for comparison with the nontraditional male students in order to see if the nontraditional males more closely resembled the students of their own sex, or if they more closely resembled the students in their chosen career areas. If there is validity to the research which suggests the linkage of personality types and aptitudes to career choices and job performance, than the scores of the nontraditional male students on measurements of these characteristics should more closely resemble the students in the same career related subject areas than the scores of the students in different occupationally oriented subject areas.

Sample

The sample consisted of students enrolled in secondary level programs in home economics, health occupations, and business and office programs in New Jersey which were successful in attracting male students. A variety of methods was used to locate the schools which participated in this study. Initially letters were sent to each of the vocational schools in the State and additionally, a selection of 60 comprehensive schools was also invited to participate in the study (see Appendix A for a copy of the letter). Some of these comprehensive schools were identified by a study done by the Office of

Civil Rights in 1979 as having some enrollment of non-traditional male students in one of the subject areas under study. Other schools were selected to reflect the diversity of types and locations of schools in the State. From this first mailing, 67 returns were received, and only eight of the schools agreed to participate, one of which had no nontraditional male students enrolled! Most of the schools which refused to participate did so because they either did not have the subject areas under study, because they did not have any male students in any of these courses, or because only one or two students were in any of the categories. This initial mailing resulted in the identification of only 28 non-traditional male students in all categories who could be tested.

Because of the low numbers of students involved, additional attempts were made to locate schools. State department personnel were contacted for suggestions of schools which might have students, as were the county career coordinators, and the private vocational school personnel. Schools which did not return the sheet from the original mailing were contacted by phone.

These efforts resulted in additional students. However, one program area, cosmetology, which was originally to be included in this study, had to be dropped because of a lack of male students enrolled

at the high school level. A total of 60 nontraditional male students was finally identified for testing, as were 64 traditional males, and 58 traditional females. A total of 182 students were tested. (See Table 1 for a breakdown of students by program area.)

It would appear that the records on the numbers of students in these nontraditional areas were highly inaccurate, especially in the areas of cosmetology and health occupations. In a number of cases, the enrollment reported to the researcher was based on the previous spring's preregistration, and by the time of the testing, the students were no longer in these courses. Either the students had changed their minds before the courses started, or had dropped out shortly after the courses began. In the areas of home economics and business and office, there was a large population to select from; but in the health occupations area, only 16 male students were located where permission was obtained for testing. While this subsample size was smaller than originally desired, the indications were that this number represented about three quarters of the total male population in the health occupations area in the eleventh and twelfth grades in New Jersey.

Nontraditional female students were not included in this study because it was felt that the inclusion of this group would direct the focus of the study away from the

TABLE 1

NUMBER OF STUDENTS IN EACH VOCATIONAL PROGRAM

Vocational Program	Traditional Males	Nontraditional Males	Females	Total
Home Economics	0	22	22	44
Business and Office	0	22	20	42
Health Occupations	0	16	16	32
Trade and Industry	64	0	0	64
Total	64	60	58	182

primary target of nontraditional male students. Interestingly, a number of schools indicated that while they did not have any nontraditional male students, that they did have some nontraditional female students, and welcomed research studies in this area.

In each school which participated in the study, the guidance counselors identified the nontraditional male students, the female students from the same classes, and the male students from the traditionally male-oriented trade and industry vocational programs, such as masonry, auto mechanics, etc. See Appendix B for a copy of the instructions which were given to the guidance personnel on the criteria for student selection. Each of the selected students was asked to sign a permission sheet, and to have their parents also sign a sheet allowing them to participate. (See Appendix C.)

The students who participated in the study represented a cross sample of geographic areas throughout the State from Atlantic to Essex counties. They came from large, small, urban, suburban and rural high schools. At the time of the study, 84 of the students were from comprehensive high schools, and 98 were from vocational high schools: 94 were in the eleventh grade and 88 were in the twelfth grade.

Data Gathering Instruments

Each student was asked to fill out a background information sheet which was designed to elicit information about items which had been identified as being related to career choice: family background, income, education, and experiences. See Appendix D for a copy of the background information sheet. Students were also asked to take an interest inventory and an aptitude test.

Strong Campbell Interest Inventory

The Strong Campbell Interest Inventory or the SCII was selected because of its ability to measure personality types as related to vocational preferences theorized by Holland (1966). The instrument identifies personality types as: realistic, intellectual, social, conventional, enterprising, and artistic.

The SCII instrument simply lists occupations. Respondents are asked to indicate whether they would like each kind of work listed by marking "L" for like, "I" for indifferent, and "D" for dislike on the answer sheet. Students worked at their own speed, and the answer sheets were machine scored and analyzed. The section of the score report form used for this project was the section on the analysis of General Occupational Themes. Six themes were identified on the SCII Profile Report which represented the six themes hypothesized by Holland. Each theme

was ranked according to a numerical score. It was this score which was used for the statistical analysis in this report.

The SCII is an empirical scale which has evolved over time since its inception in 1927. Reviewers (Buros, 1972) had cautions about the instrument, but generally concluded that it was the best around. The scale was formed by using clusters of statistically related items from a comparison of sample sizes ranging from 72 to 1,199. For each item on the instrument, the five highest and the five lowest ranking items were identified to show the distribution extremities.

Concurrent validity was determined by comparing the percentage of overlay between the criterion and reference samples on the occupational scales. The lower the percentage of overlap (on a scale of 0-100), the greater the scale discriminated between the two samples. The median overlap for the two groups on the SCII was 36%, which meant that the scales separated the criterion samples from the reference sample by about 1.8 standard deviations on the average. The scales varied considerably in their validity.

Recent studies of predictive validity (Campbell, 1977) indicated that about half of the subjects in follow-up studies selected career areas consistent with their test results. The level of predictive validity was influenced

by external factors, but seemed to be most accurate in predicting occupational choice when the occupation selected was one of those listed in the profile, and when the students had a well-defined interest pattern. Test-retest reliability correlations ranged from the .50's for 16 year olds retested 36 years later, to the .90's for samples tested and retested over a few weeks.

Differential Aptitude Test

The aptitude test selected was the Differential Aptitude Test or the DAT. This test is designed to measure verbal reasoning, numerical ability, abstract reasoning, clerical speed and accuracy, mechanical reasoning, space relations, and spelling and grammar. It also yields a combined score of verbal reasoning plus numerical ability which can be interpreted in a manner similar to an IQ score. The advantage of this test is that the mathematics is nonverbal, the abstract reasoning uses pictures, and the terminology is simple, thus minimizing the effects of language skills on the test results. The items which this test measures have been linked to sex differences in previous studies (Maccoby & Jacklin, 1974).

The reliability coefficients on the subtests range from .79 to .97. One negative aspect of the instrument is the section on mechanical reasoning. This section

is highly sex stereotyped, and the reliability coefficient for this section is lower than for the other sections. Thus, when it became necessary to shorten the time for testing due to problems with scheduling in the schools, this section was dropped.

The DAT was designed for counseling and placement of students. For these reasons, predictive validity was important. The largest number of validity studies for this instrument relate to the prediction of grades in specific courses, and to scores on achievement tests. These studies are reported in detail in the test manual. The most effective predictors of course grades in English were verbal reasoning, numerical ability, and language usage with median coefficients of between .46 and .52. The most effective sections for predicting success in business courses were verbal reasoning plus numerical ability, numerical ability, and language usage with the median coefficients falling between .42 and .56. The correlation coefficient for a comparison of the DAT scores with SAT scores was between .72 and .78.

Work done by Bennett, Seashore, and Wesman in 1950-51 and 1954-55 (Bennett, 1974) sought to identify any relationship between scores on the DAT and future occupational choices. In this study, questionnaires were sent to 2,900 former high school students who had taken the DAT while they were juniors and seniors in high school. These

former students were asked what they had done following high school graduation. The answers were matched with the students' previous DAT scores. The results showed that the students' job levels within occupational areas were related to the scores on the most relevant tests.

Data Collection

The instruments were administered by the guidance counselors and by the researcher in the participating schools. Specific instructions were provided for each testing session both by the researcher (see Appendix E) and the producers of the test instruments to aid in the standardization of the testing situations. Careful proctoring of the testing situations was conducted. However, it was not always possible to do the testing in identical length time periods because of the scheduling differences in the different schools. In some schools, the testing was done all in one day. In others, the testing had to be done over two or more days. However, only the DAT was done in parts, and this test is divided into sections to allow for this possibility. When breaks had to occur in the testing period, they were scheduled to come between different sections of the test as suggested by the test instructions manual. These scheduling differences may have introduced an element of bias into the test results. In order to counteract this bias, on the days when the testing period was long, breaks were given between the test sections,

and where the testing could not be completed in one day, the parts of the test were administered on consecutive days as suggested by the manual, so that there were no long breaks between testing times. There were no indications of differences in the norms for the test scores in the manual based on the differences in organization of the time periods for the administering of the tests.

Data Analysis

The data analysis for this project was done using the Statistical Analysis System (SAS). The specific procedures used were the t-test, analysis of variance (ANOVA) for unbalanced data using the General Linear Models (GLM) procedure (SAS, 1979), and Duncan's Multiple range test. The accepted level of significance for this study was $p < .05$.

The t-test statistic was used to test hypotheses H_{O_1} and H_{O_2} related to the differences between the means of the nontraditional males and the traditional males on measures of aptitude and measures of personality. The t-test was also used to test hypotheses H_{O_3} and H_{O_4} related to the differences between the means of the nontraditional males and the traditional females.

Analysis of variance (ANOVA procedure for unbalanced data, i.e. cells contain different sample sizes) was used to test the null hypotheses H_{O_5} and H_{O_6} of no significant differences among the three groups of nontraditional students on measures of aptitude and personality. The

Duncan procedure was used to make a post hoc comparison of the differences between each of the subgroups of non-traditional males on measures of aptitude and personality. This was done because the ANOVA procedure did not provide specific information about the location of the differences. The Duncan procedure was selected to provide more precise information about the differences in the three groups of nontraditional students. The Duncan procedure was also used to provide additional information about hypotheses H_{O_3} and H_{O_4}.

Raw scores, rather than test norms, were used for all of the data analysis.

CHAPTER IV

PRESENTATION OF FINDINGS AND DISCUSSION

Both the Differential Aptitude Test and the Strong Campbell Interest Inventory were administered to the students, and the scores were analyzed to see if the non-traditional students did, in fact, follow patterns which were similar to students traditionally enrolled in these vocational programs or if they followed patterns traditional for their sex.

Hypothesis 1

Hypothesis 1 stated that there will be significant differences ($p < .05$) in aptitudes, as measured by the subparts of the Differential Aptitude Test, between male students who elect nontraditional vocational subjects and male students who elect traditional vocational subjects. Specifically, it was felt that significant differences in scores on some of the subparts of this instrument would provide the student and the counselor with useful information for career guidance and course selection. These specific aptitudes are identified by hypotheses 1a and 1b.

Hypothesis 1a

Male students who elect nontraditional vocational subjects will score higher than male students who elect traditional vocational subjects ($p < .05$) in the aptitude areas of language usage and clerical speed and accuracy. Language usage, a measure of how well one can identify correct grammar, is important in clerical kinds of jobs. This skill also has correlated significantly for boys as a basis for prediction of grades in business courses (Bennett et al., 1973), and as a prediction of grades in high school science courses. It is an important component for success in health occupations and in home economics related occupations. Clerical speed and accuracy is the ability to do routine work which is important in filing, coding and stock room work.

Findings.--The SAS (Statistical Analysis System) computer system for data analysis was used for the analysis of data. A t-test procedure was used to compute a t statistic for testing the hypothesis that the means of the two groups were equal. Specifically, the t-test was used to compare the nontraditional males with the traditional males on the DAT subparts of language usage and clerical speed and accuracy. The results are shown in Table 2.

For the subpart of language usage, the traditional males had a mean score of 24.51 and the nontraditional

TABLE 2

MEANS AND STANDARD DEVIATIONS OF TRADITIONAL AND NONTRADITIONAL MALES ON THE APTITUDES OF LANGUAGE USAGE AND CLERICAL SPEED AND ACCURACY

Group	N	Mean	Std. Dev.	t value
		Language Usage		
Traditional Males	61	24.51	7.51	2.29*
Nontraditional Males	54	28.39	10.54	
		Clerical Speed and Accuracy		
Traditional Males	63	50.32	12.35	0.73
Nontraditional Males	59	48.54	14.66	

*$p < .05$

males had a mean score of 28.39. The difference between the two means was found to be significant at the $p < .05$ level. Thus, the first part of the hypothesis was not rejected. Male students who elected nontraditional vocational subjects did score significantly higher than male students who elected traditional vocational subjects in the aptitude area of language usage.

In the area of clerical speed and accuracy, the traditional males had a mean score of 50.32 and the nontraditional males had a mean score of 48.54. The difference in scores was not found to be significant at the $p < .05$ level. Because of this result, this part of hypothesis 1a was rejected. Male students who elected nontraditional vocational subjects did not score significantly higher than male students who elected traditional vocational subjects in the aptitude of clerical speed and accuracy.

Hypothesis 1b

Hypothesis 1b stated that male students who elect nontraditional subjects will score lower than male students who elect traditional vocational subjects ($p < .05$) in the aptitude area of space relations. The reason for suggesting this hypothesis was that space relations, the ability to visualize in three dimensions or to mentally picture the shape, size, and position of objects when shown only a

picture or pattern, is needed by people who work in the building trades or as machinists--career areas which are represented by the vocational subject areas frequently selected by male students. This skill is of lesser importance to successful performance in the careers related to business and office work, health occupations, and home economics related occupations; thus, it was hypothesized that the male students in these areas would have lower scores in space relations.

Findings.--A t-test was used to compare the scores of nontraditional males with those of traditional males on the aptitude of space relations. The results of this analysis are shown in Table 3. The traditional males had a mean score of 32.13, while the nontraditional males had a mean score of 26.21. The scores were found to be significantly different at the $p < .01$ level. Therefore, the hypothesis was not rejected. Male students who elected nontraditional subjects scored significantly lower than male students who elected traditional vocational subjects in the aptitude area of space relations.

Discussion.--For the aptitudes of language usage and space relations, the nontraditional students in this study followed the expected pattern, that is, they scored significantly higher in language usage, and significantly lower in space relations than their traditional counterparts. This is in keeping with the patterns shown by the

TABLE 3

MEANS AND STANDARD DEVIATIONS OF TRADITIONAL AND NONTRADITIONAL MALES ON THE APTITUDE OF SPACE RELATIONS

Group	N	Mean	Std. Dev.	t Value
Traditional Males	62	32.13	12.33	2.79**
Nontraditional Males	56	26.21	10.51	

**p < .01

people who were already working in the careers represented by the vocational programs under study.

The pattern did not follow, however, for the aptitude of clerical speed and accuracy. There are some indications that clerical speed and accuracy is a sex-linked trait. Durkin (undated) in a study of graphoria--a measure of clerical speed and efficiency--found that 17 year old boys at the 50th percentile took 7.2 minutes to complete a work-sample, and 17 year old girls at the 50th percentile took 6.48 minutes. He concluded that women excelled in this category. If clerical speed and accuracy is a sex-linked trait, it helps to explain the findings of this study of no significant difference between the two groups of male students. Additional discussion of this aptitude can be found in the section under hypothesis 3.

In summary, hypothesis 1 was not rejected for two of the subparts of the Differential Aptitude Test, but was rejected for one subpart. There were significant differences in aptitudes as measured by the DAT in the areas of language usage and space relations, but not in clerical speed and accuracy between male students who elected traditional vocational programs. As expected, no significant differences were found between the nontraditional males and the traditional males in all of the other aptitudes tested: verbal reasoning, numerical ability, abstract reasoning, and spelling. The means, standard deviations,

and t values for these aptitudes are reported in Table 4.

Hypothesis 2

Hypothesis 2 states: male students who elect non-traditional vocational subjects will score differently than male students who elect traditional vocational subjects ($p < .05$) on personality types, as measured by the Strong Campbell Interest Inventory.

If, as Holland suggests (1959), there is a linkage between vocational interests and personality, than it is reasonable to assume that students who have expressed an interest in a specific vocational area by electing the program during the high school years would exhibit personality characteristics similar to those shown by workers in these same occupational areas. These personality characteristics can be measured by the general occupational themes as defined by the SCII, and include: realistic, investigative, artistic, social, enterprising, and conventional.

Findings

Again, a t-test was used to compare the scores of the two groups of male students on each general occupational theme which corresponds to each personality type. The results are presented in Table 5. These two groups of students scored significantly different in all categories except the investigative type. The traditional group of

TABLE 4

MEANS AND STANDARD DEVIATIONS OF TRADITIONAL AND NONTRADITIONAL MALES ON THE APTITUDES OF VERBAL REASONING, NUMERICAL ABILITY, ABSTRACT REASONING, AND SPELLING

Group	N	Mean	Std. Dev.	t Value[a]
		Verbal Reasoning		
Traditional Males	58	21.02	9.62	0.29
Nontraditional Males	53	20.45	11.04	
		Numerical Ability		
Traditional Males	58	19.50	8.23	0.30
Nontraditional Males	51	19.00	9.24	
		Abstract Reasoning		
Traditional Males	62	32.29	7.58	1.60
Nontraditional Males	57	29.70	9.96	
		Spelling		
Traditional Males	60	61.15	15.46	0.22
Nontraditional Males	58	61.83	18.17	

[a]No significant differences found.

TABLE 5

MEANS AND STANDARD DEVIATIONS OF TRADITIONAL AND NONTRADITIONAL MALES ON MEASURES OF PERSONALITY TYPES

Group	N	Mean	Std. Dev.	t Value
		Investigative		
Traditional Males	64	34.34	11.59	1.88
Nontraditional Males	59	38.15	10.74	
		Realistic		
Traditional Males	64	55.23	9.71	4.06****
Nontraditional Males	59	47.86	10.42	
		Social		
Traditional Males	64	33.61	10.04	4.02****
Nontraditional Males	59	41.71	12.2[illegible]	
		Conventional		
Traditional Males	64	38.27	7.78	4.73****
Nontraditional Males	59	46.20	10.72	

TABLE 5--Continued

Group	N	Mean	Std. Dev.	t Value
		Enterprising		
Traditional Males	64	42.81	8.58	2.87**
Nontraditional Males	59	47.68	10.19	
		Artistic		
Traditional Males	64	36.02	8.45	2.45*
Nontraditional Males	59	40.12	10.08	

*$p < .05$

**$p < .01$

****$p < .0001$

males scored significantly higher in the realistic type with a mean of 55.23 compared to a mean for the non-traditional students of 47.86. This difference was found to be significant at the $p < .001$ level.

The nontraditional males scored higher in the social type with a mean of 41.71 which was found to be significantly higher at the $p < .0001$ level than the mean score of 33.61 for the traditional males.

The conventional type scores also showed a significant difference at the $p < .0001$ level. In this category, the nontraditional males had a higher mean score of 46.20 as compared to a mean score for the traditional males of 38.27.

In the enterprising type, the nontraditional males again had a significantly higher score at the $p < .01$ level with a mean score of 47.68 compared to a mean of 42.81 for the traditional males.

The nontraditional males scored higher in the artistic type with a mean of 40.12 compared with a mean of 36.02 for the traditional males. This was found to be significant at the $p < .05$ level.

These findings indicated that except for the investigative type, hypothesis 2 was not rejected. Male students who elected nontraditional vocational subjects did score differently than male students who elected traditional vocational subjects on personality types,

as measured by the Strong Campbell Interest Inventory.

Discussion

A possible explanation for these results might be found in the fact that people in occupations, such as carpenter, farmer, machinist, and tool and die maker--all areas which would be represented by traditional male vocational programs--tend to score high in the realistic type and lower in other types (Campbell, 1977), thus, the results indicate that the traditional students closely resemble the workers in their chosen occupational areas. The fact that the nontraditional males scored higher in the other types might be a reflection of the diversity of interests represented by the three nontraditional male vocational programs under study. This aspect of the results was further investigated by the analysis of each of the specific nontraditional vocational programs under study in hypotheses 5 and 6.

Hypothesis 3

Hypothesis 3 stated that there will be no significant differences in aptitude ($p < .05$) for the scores of the subparts of the Differential Aptitude Test, between males and females enrolled in the areas of the home economics related occupations, health occupations, and business and office programs.

If people select careers based on a number of factors which include personality/interests and aptitudes, than it would seem that the students in any specific program would show general patterns similar to each other in both aptitudes and personality regardless of their sex, and also patterns which are similar to the workers already in these occupational areas. For this reason, a comparison was done of the boys and the girls in each of the nontraditional male subject areas under study.

Findings

A General Linear Models program was used to do an analysis of variance procedure for differences among the students enrolled in the three programs with sex as the independent variable. The purpose was to determine if the differences in aptitude scores could be attributed to differences between the sexes, or differences among the courses.

The results of the analysis of variance procedure for the test scores on the subparts of the DAT are shown in Table 6. Sex differences were found in the two aptitudes of spelling and clerical speed and accuracy. In spelling there was a greater significant sex difference (at the $p < .001$ level) than course difference. In clerical speed and accuracy, only the sex difference

TABLE 6

ANALYSIS OF VARIANCE OF SUBPARTS OF THE DIFFERENTIAL APTITUDE TEST BY PROGRAM AND SEX

Source	df	SS	F Value
	Clerical Speed and Accuracy		
Sex	1	3044.84	16.39****
Program	2	230.73	0.62
Sex + Program	2	221.57	0.60
	Spelling		
Sex	1	3203.82	12.01***
Program	2	3163.84	5.93**
Sex + Program	2	1615.20	3.03
	Numerical Ability		
Sex	1	10.23	0.14
Program	2	484.43	3.23*
Sex + Program	2	12.25	0.08
	Verbal Reasoning		
Sex	1	117.77	1.31
Program	2	1318.38	8.33**
Sex + Program	2	33.64	0.19
	Abstract Reasoning		
Sex	1	112.43	1.66
Program	2	1256.18	9.29***
Sex + Program	2	57.53	0.43
	Space Relations		
Sex	1	146.69	1.73
Program	2	1365.48	8.06***
Sex + Program	2	709.92	4.19*

TABLE 6--Continued

Source	df	SS	F Value
		Language Usage	
Sex	1	143.47	1.36
Program	2	3030.94	14.37****
Sex + Program	2	14.97	0.07

*p < .05

**p < .01

***p < .001

****p < .0001

was found to be significant. This aptitude was significant at the $p < .0001$ level. The girls' scores were higher than the boys' scores in both of these aptitudes. This finding supports past research on sex differences indicating that girls tend to score somewhat higher in these areas than boys (Maccoby & Jacklin, 1974).

In all other aptitudes the program variable accounted for the differences in the scores. Program differences were found to be significant at the $p < .05$ level for numberical ability; at the $p < .01$ level for the areas of verbal reasoning and spelling at the $p < .001$ level for abstract reasoning and space relations; and at the $p < .0001$ level for language usage.

On the basis of the results of this analysis, hypothesis 3, except for two subparts, was not rejected. There were no significant differences in aptitude for the scores of the subparts of the Differential Aptitude Test, between males and females enrolled in the areas of home economics related occupations, health occupations, and business and office programs, except in the subparts of spelling and clerical speed and accuracy, where the females scored significantly higher than the males.

Additional testing of the figures was done to try to pinpoint, more specifically, the areas of program difference. Duncan's Multiple Range Test was performed to identify the source of variance among the groups. The

results of this test can be found on Table 7. These results indicated the following:

Spelling and space relations--Home economics and business students were similar to each other, but the health occupations students scored significantly lower than the other two groups.

Numerical ability and verbal reasoning--Home economics students scored significantly higher than the health occupations students, while the means for the business and office students fell between the other two groups and were not significantly different from either of these two groups.

Abstract reasoning--Home economics students scored significantly higher than either health occupations or business and office students.

Language usage--All three groups of students had scores which were significantly different from each other. The home economics students had the highest scores, the business and office students were next, and the health occupations students scored the lowest of the three groups.

Discussion

The fact that clerical speed and accuracy and spelling should be found to be linked to sex differences is not surprising in light of past research which has found that

TABLE 7

DUNCAN'S MULTIPLE RANGE TEST FOR COURSE DIFFERENCES ON SUBPARTS OF THE DIFFERENTIAL APTITUDE TEST

Vocational Programs	N	Mean	Duncan's[a] Value
Clerical Speed and Accuracy			
Home Economics	44	53.91	A
Health Occupations	32	51.55	A
Business and Office	42	54.68	A
Spelling			
Home Economics	43	68.74	A
Health Occupations	32	58.66	B
Business and Office	42	70.41	A
Numerical Ability			
Home Economics	44	20.32	A
Health Occupations	31	15.26	B
Business and Office	32	19.25	BA
Verbal Reasoning			
Home Economics	44	23.02	A
Health Occupations	33	14.66	B
Business and Office	32	18.75	AB
Abstract Reasoning			
Home Economics	44	34.84	A
Health Occupations	31	27.65	B
Business and Office	41	28.44	B

TABLE 7--Continued

Vocational Programs	N	Mean	Duncan's[a] Value
	Space Relations		
Home Economics	43	28.14	A
Health Occupations	31	19.32	B
Business and Office	40	25.25	A
	Language Usage		
Home Economics	43	34.74	A
Health Occupations	27	21.37	C
Business and Office	40	28.85	B

[a]Different letters for each aptitude indicate that the means are significantly different.

women excel in these areas (Durkin, undated; Maccoby & Jacklin, 1974). However, another sex linked aptitude, space relations, at which the boys might have been expected to excel, did not show any significant sex difference. Perhaps boys who do not excel at this skill choose career areas where this skill is of lesser importance to successful performance.

Differences were found in the program variable. While this result was expected, what was not expected by the researcher was the pattern of the scores. In general, the scores of the home economics students were the highest of the three groups, the business and office students were second, the health occupations students were the lowest. This seems to indicate the effect of an unmeasured variable on the results. This unknown variable might be socioeconomic level. The reported family incomes followed the same pattern as the test scores. The family incomes of the home economics students were reported as being the highest of the three groups, and the health occupations students', the lowest. However, not enough of the students responded to this question on the background information sheet to allow for any meaningful analysis of this factor.

A second possible intervening variable might be language skills. A high percentage of the health occupations students were from inner city schools with a high

population of students who used English as a second language. English as a second language students had low scores on state-wide basic skills tests, and thus, there is some question as to the effect of the reading skills of these students on the test results. Because of the nature of the DAT, these low reading skills may have introduced an element of bias into the study, especially in those sections of the test which measure English skills, such as verbal reasoning and language usage. However, the nonverbal sections--such as numerical ability, abstract reasoning, clerical speed and accuracy, and space relations--should not have been affected.

Hypothesis 4

Hypothesis 4 stated that there will be no significant differences in personality scores ($p < .05$) as measured by the Strong Campbell Interest Inventory, between males and females in home economics related occupations, health occupations, and business and office programs. Here again, the thinking behind this hypothesis is related to attempts to link career selection with interests.

Findings

The analysis of variance procedure was used--this time to analyze the scores on the Strong Campbell Interest Inventory--General Occupational Themes section--which is a

measure of personality types. The results of this analysis are shown in Table 8.

The only category to show a significant sex difference was the realistic personality type which showed significant differences both in the sex variable (at the $p < .0001$ level) and in the program variable (at the $p < .01$ level). Other types in which the program variable showed significant differences were the investigative type at $p < .0001$, the artistic type at $p < .05$, and the enterprising type at $p < .05$. No type other than the realistic showed significant differences related to the sex variable. There was no significant difference in either program or sex for the social and the conventional types. Thus, except for the realistic type, hypothesis 4 cannot be rejected.

There was no significant difference in personality scores as measured by the SCII, between males and females in home economics related occupations, health occupations, and business and office programs, except in the realistic type. The boys scored higher.

Duncan's Multiple Range Test was also performed on the SCII scores for additional clarification of the results. The findings of this procedure are reproduced on Table 9. The home economics students scored significantly higher in the realistic and the enterprising types than the other two groups of students. The health occupations students scored significantly higher in the

TABLE 8

ANALYSIS OF VARIANCE OF STRONG CAMPBELL INTEREST INVENTORY SCORES BY SEX AND PROGRAM

Source	df	SS	F Value
		Realistic	
Sex	1	3662.31	50.05****
Program	2	782.45	5.35**
Sex + Program	2	283.89	1.94
		Investigative	
Sex	1	143.82	1.59
Program	2	7569.63	14.19****
Sex + Program	2	420.65	2.32
		Artistic	
Sex	1	149.45	1.46
Program	2	675.19	3.30*
Sex + Program	2	14.21	0.07
		Social	
Sex	1	161.26	1.26
Program	2	613.75	2.40
Sex + Program	2	601.70	2.35
		Enterprising	
Sex	1	27.12	0.29
Program	2	708.16	3.82*
Sex + Program	2	255.59	1.38
		Conventional	
Sex	1	182.54	1.53
Program	1	222.07	0.93
Sex + Program	2	32.54	0.14

*p < .05

**p < .01

****p < .0001

TABLE 9

DUNCAN'S MULTIPLE RANGE TEST FOR COURSE AND SEX ON THE GENERAL OCCUPATIONAL THEMES OF THE STRONG CAMPBELL INTEREST INVENTORY

Source	N	Mean[a]	Duncan's[b] Value
	Realistic		
Program			
Home Economics	44	45.39	A
Health Occupations	32	40.30	B
Business and Office	42	39.95	B
Sex			
Male	60	47.86	A
Female	58	36.29	B
	Investigative		
Program			
Home Economics	44	36.25	B
Health Occupations	32	43.91	A
Business and Office	42	32.17	B
Sex			
Male	60	38.15	A
Female	58	35.80	A
	Artistic		
Program			
Home Economics	44	43.39	A
Health Occupations	32	42.64	A
Business and Office	42	38.05	B
Sex			
Male	60	40.12	A
Female	58	42.53	A

TABLE 9--Continued

Source	N	Mean[a]	Duncan's[b] Value
		Social	
Program			
Home Economics	44	43.00	AB
Health Occupations	32	45.91	A
Business and Office	42	40.07	B
Sex			
Male	60	41.71	A
Female	58	43.88	A
		Enterprising	
Program			
Home Economics	44	50.20	A
Health Occupations	32	45.12	B
Business and Office	42	45.24	B
Sex			
Male	60	47.68	A
Female	58	46.44	A
		Conventional	
Program			
Home Economics	44	45.80	A
Health Occupations	32	47.48	A
Business and Office	42	49.00	A
Sex			
Male	60	46.20	A
Female	58	48.56	A

[a]Scores ranged from 25 to 69. The higher the score, the more closely a person resembles the personality type.

[b]Different letters indicate that the means were significantly different.

investigative type. The business and office students, while not significantly different from the other two groups in any one personality type, were most different from the health occupations students in the investigative and the social types, and most different from the home economics students in the realistic, artistic, and enterprising types.

Here again, the reading skill level of some of the health occupations students may have influenced the results. However, because of the nature of the instrument, the students were able to ask questions about the job categories on the list. A number of the students did ask for clarification of some of the jobs. For this reason, it is believed that the low reading skill level did not have a negative effect on the results.

Discussion

According to Campbell (1977), men and women have different distributions on these SCII scales. Men tend to score higher in the realistic, investigative, and enterprising types, while women tend to score higher in the artistic, social, and conventional types. In a report of, "Men and Women in General Samples," (each N = 300), the category which showed the greatest differences in mean scores was the realistic type. The mean score for the men was 54.5, and the mean score for the women was 45.5, a difference of nine points between the two means.

Thus, of all of the categories of personality types, the realistic type is the most strongly sex linked. This pattern is repeated in the study being reported in this paper. There was a difference of the means between the boys and the girls of 11.57 with the boys scoring higher.

Because of the strong linkage between the personality type and the career choice of individuals, it was felt that the career patterns as represented by vocational program selection would be a more important factor than sex differences. Except for the realistic type, this was the result of the analysis.

Hypothesis 5

Hypothesis 5 stated that there will be no significant differences ($p < .05$) as measured by the subparts of the Differential Aptitude Test, among the male students who elect home economics related programs, health occupations, and business and office programs.

Male students who elect nontraditional vocational programs are a definite minority within the school population. It was felt that their unique position within the school structure would result in differences in their aptitude and personality scores from the traditional male students. However, at the same time, it was felt that they would tend to resemble each other to a measurable extent because of their pioneering role.

Findings

The scores of the nontraditional males on the DAT were analyzed using the analysis of variance procedure. The results can be found on Table 10.

Significant differences were found in five of the eight aptitudes tested. Significant at the $p < .05$ level were verbal reasoning and abstract reasoning. Language usage was significant at the $p < .01$ level, while space relations and spelling were significant at the $p < .001$ level. No significant differences were found in the aptitudes of numerical ability, and clerical speed and accuracy.

The mean scores for each group of students are reported in Table 11 in order to provide further clarification. The home economics students scored the highest in all of the aptitudes except spelling where the business and office students had the highest score. The health occupations students scored the lowest in every aptitude except abstract reasoning where they scored slightly higher than the business and office students.

Because of the significance found in five categories, the hypothesis had to be rejected. There were significant differences as measured by the subparts of the DAT among the male students who elected home economics related occupations, health occupations, and business and office programs, except for numerical ability and clerical speed and accuracy.

TABLE 10

ANALYSIS OF VARIANCE ON MEASURES OF APTITUDE FOR MALE STUDENTS IN HOME ECONOMICS, HEALTH OCCUPATIONS AND BUSINESS AND OFFICE

Source	df	Sum of Squares	F Value
		Verbal Reasoning	
Program	2	830.53	3.77*
		Abstract Reasoning	
Program	2	840.98	4.81*
		Language Usage	
Program	2	1334.84	7.47**
		Space Relations	
Program	2	1529.95	8.92***
		Spelling	
Program	2	4328.87	8.22***
		Numerical Ability	
Program	2	283.63	1.71
		Clerical Speed and Accuracy	
Program	2	275.63	0.63

*p < .05

**p < .01

***p < .001

TABLE 11

DUNCAN'S MULTIPLE RANGE TEST ON MEASURES OF APTITUDE FOR MALE STUDENTS IN HOME ECONOMICS, HEALTH, AND BUSINESS

Vocational Program	N	Mean	Duncan's Value
Verbal Reasoning			
Home Economics	22	24.81	A
Business and Office	22	19.33	AB
Health Occupations	16	15.50	B
Abstract Reasoning			
Home Economics	22	34.55	A
Business and Office	22	26.57	B
Health Occupations	16	26.79	B
Language Usage			
Home Economics	22	33.18	A
Business and Office	22	28.10	B
Health Occupations	16	20.08	C
Space Relations			
Home Economics	22	32.41	A
Business and Office	22	23.90	B
Health Occupations	16	19.79	BA
Spelling			
Home Economics	22	61.77	A
Business and Office	22	69.76	A
Health Occupations	16	47.87	B

TABLE 11--Continued

Vocational Program	N	Mean	Duncan's[a] Value
	Numerical Ability		
Home Economics	22	21.09	A
Business and Office	22	19.33	A
Health Occupations	16	15.36	A
	Clerical Speed and Accuracy		
Home Economics	22	50.68	A
Business and Office	22	48.81	A
Health Occupations	16	45.25	A

[a]Different letters for each aptitude indicate that the means are significantly different.

Discussion

Simply because these students can all be classified as nontraditional does not mean that they have similar skills and abilities. In fact, quite the opposite seems to be the case. A more important consideration appears to be the career goals of the students as evidenced by the type of occupationally oriented program the students have elected. Perhaps these findings should not be too surprising in light of the differences in skills needed for success in the careers associated with each of the different areas.

Spelling is an important aptitude for success in business and office jobs, and thus, it was anticipated that the business and office students would score the highest of the three groups in this measure. The unexpected result, however, for this group of students is that they did not score the highest in clerical speed and accuracy and language usage. While clerical speed and accuracy is a sex linked trait, it is also important to successful performance in these jobs, as is language usage.

The previously found pattern in which the home economics scores were generally higher than those of the other groups, and the health occupations scores were generally the lowest, again was the prevalent pattern. It was felt that socioeconomic or cultural

expectations may have been responsible for these results, or that language and test taking skills may have played a role in influencing the outcome.

Hypothesis 6

Hypothesis 6 stated that there will be no significant differences in personality types ($p < .05$) as measured by the Strong Campbell Interest Inventory among male students who elect home economics related occupations, health occupations, and business and office programs. Again, it was felt that this would be the case because of these students' common bond of nontraditionalism.

Findings

The results of the analysis of variance procedure for differences among the nontraditional male students in these programs on measures of personality types are reported in Table 12.

Only one category showed any significant differences. This personality is the realistic type which was found to be significant at the $p < .05$ level. This is the same personality type which showed significant differences earlier for both the comparison of the traditional males with the nontraditional males, and for the comparison between the sexes.

Since there were no significant differences in any of the other categories, the hypothesis cannot be rejected

TABLE 12

ANALYSIS OF VARIANCE ON MEASURES OF PERSONALITY TYPES FOR MALE STUDENTS IN HOME ECONOMICS, HEALTH OCCUPATIONS AND BUSINESS AND OFFICE

Source	df	Sum of Squares	F Value
		Realistic	
Program	2	923.20	4.81*
		Investigative	
Program	2	463.12	2.08
		Artistic	
Program	2	288.73	1.44
		Social	
Program	2	14.33	0.05
		Enterprising	
Program	2	480.62	2.42
		Conventional	
Program	2	85.05	0.36

*$p < .05$

except for the realistic personality type. There were no significant differences in personality types, except for the realistic type, as measured by the SCII among male students who elected home economics related occupations, health occupations, and business and office programs. The home economics students scored the highest in this measure, indicating that of these three groups of students, they most closely resembled the realistic type.

Discussion

Because of the repeated significance found in the realistic measure, it is important to take a closer look at it. Both the sex of the student, and the course in which he or she is enrolled seems to strongly influence the scores in this personality type.

In order to provide greater insight into this specific personality type, the means for all of the groups of students for the realistic measure on the occupational theme scores are presented in Table 13. As expected, the means for the traditional males is higher than the means for the nontraditional males since Campbell (1977) describes this personality type as:

> robust, rugged, practical, and physically strong; somewhat uncomfortable in social settings; have good motor coordination and skills but lack verbal and interpersonal skills; usually perceive themselves as mechanically and athletically inclined; are practical, stable, natural, persistent; prefer concrete to abstract problems; see themselves as

TABLE 13

MEANS AND STANDARD DEVIATIONS FOR THE REALISTIC SUBPART OF THE SCII BY COURSE AND SEX

Vocational Program	Sex	N	Mean	Standard Deviation
Trade and Industry	Male	64	55.23	9.71
Home Economics	Male	22	52.95	7.40
Health Occupations	Male	16	44.13	11.66
Business and Office	Male	22	45.38	10.46
Home Economics	Female	22	37.82	7.14
Health Occupations	Female	16	36.71	6.45
Business and Office	Female	20	34.25	7.54

> aggressive; have conventional political and economic goals; and rarely perform creatively in the arts or sciences, but do like to build things with tools. Realistic types prefer such occupations as mechanic, engineer, electrician, fish and wildlife specialist, crane operator, tool designer, and various technical positions. (p. 31-32)

These characteristics seem consistent with the characteristics of workers in career areas represented by the traditionally male vocational subject areas such as those found in trade and industry. Since this description is more in keeping with society's perceptions of male roles than female roles, it is not surprising that the males scored higher in this area than did the females, and that the traditional males had the highest scores of all the groups represented.

Other Findings

The background information sheet (Appendix D) was used to gather information about the students and their families which previous research had indicated was related to career choice. The information from these sheets was analyzed to see how this information might be related to the hypothesized findings.

Parental Influence

Of all the nontraditional male students in this study, only three indicated that their mothers held jobs which could be in any way considered nontraditional for their sex. These three jobs were listed as machinist, accountant, and

bus driver. None of the occupations listed for the fathers was considered to be nontraditional for their sex. Thus, it was felt that the employment role models presented by the parents were not of great significance in influencing the male sons to elect a nontraditional vocational program. However, nine of these students indicated that it was a parent who suggested that they enroll in a vocational program. This is approximately 15% of the nontraditional males studied, and would indicate that some parental influence is at work in this area.

Introductory Vocational Experience

The students were asked to indicate if they had been exposed to any introductory or exploratory vocational experience before they elected the program in which they were currently enrolled. A summary of the number of students who indicated that they did have this type of an experience can be found on Table 14. Of the nontraditional male students, 32% reported having such an exposure, while only 14% of the traditional male students indicated that they had any introduction to a variety of vocational areas. These figures indicate that there is some value in exposing students to a variety of experiences in order to expand their career choice options.

TABLE 14

PERCENTAGE OF STUDENTS BY CATEGORY WHO HAD AN EXPLORATORY VOCATIONAL EXPERIENCE

Group	N	% Previous Experience	% No Previous Experience	% No Response
Nontraditional Males	60	32	60	8
Nontraditional Females	58	32	63	5
Traditional Males	64	14	65	20

Previous Job Experience

The apparent influence of previous exposure to nontraditional areas is also illustrated by the answer to the question about job experience on the background information sheet. Each student's response was classified into one of two categories: (a) no previous work experience, or work experience related only to traditional careers for the sex of the respondent, e.g., lawn mowing for boys, or babysitting for girls; or (b) any experience of a nontraditional nature for the sex of the respondent, e.g., kindergarten aid for boys, or construction work for girls. While the results of this are somewhat dependent upon the interpretation of the researcher about the jobs listed, the findings indicated that of the nontraditional male students, 21 (35%) had at least one job experience which could be considered nontraditional for males. Of the females in the traditionally female subject areas, only three (5%) had held any job which could be considered nontraditional for their sex, and of the traditional male students, only three (4%) listed any jobs which were considered nontraditional for males.

People Influencing Students' Choices

One of the interesting findings of this study was related to the response of the nontraditional males to the question, "Who suggested that you take a vocational

program?" Fifty-four percent of the responding nontraditional male students in home economics and business and office programs checked the "other" column and wrote in words, such as "me" or "I wanted it," indicating that they were self-motivated.

However, of the health occupations students responding to this question, only one of the nontraditional male students indicated that he selected the program on his own, while seven indicated that a guidance counselor had suggested the program. Table 15 shows the number and the percentage of responses in each category by the nontraditional male students to the question, "Who suggested that you take a vocational program?"

Tangri (1972) conducted a study which indicated that females who choose nontraditional careers were more autonomous, individualistic, and motivated by internally imposed demands. The independence of the male students in home economics and business and office programs would indicate that this same independence holds true for these male students. However, it is difficult to explain the difference between these nontraditional males and the nontraditional males in the health occupations programs. The health occupations students did not seem to be internally (self) motivated. Possibly the cultural or socioeconomic background again plays a role here. Perhaps the guidance personnel were viewed as people in a strong

TABLE 15

NUMBER AND PERCENT OF NONTRADITIONAL MALES RESPONDING IN EACH CATEGORY TO THE PERSON INFLUENCING THEIR DECISION TO ELECT A VOCATIONAL PROGRAM

Influence	Home Economics		Health		Business	
	N	%	N	%	N	%
Guidance	2	10	7	44	5	24
Parent	0	0	4	25	5	24
Friend	3	15	4	25	1	5
Other - Self	13	65	1	6	9	42
Other - Misc.	2	10	0	0	1	5

authority position whose opinions were sought and respected by this group of students to a greater extent than was the case with the other students. Whatever the reasons behind these findings, there is certainly room here for further investigation.

Summary

Analysis of variance and t-tests procedures were the primary analytical tools used to compare the aptitudes and the personality types of male high school students enrolled in home economics related occupations, health occupations, and business and office programs. These nontraditional male students were compared with males enrolled in the traditionally male vocational programs, with the females enrolled in the traditionally female vocational areas, and comparisons were also made among the three groups of nontraditional male students.

The results of this study indicate that, in general, male students who elected nontraditional vocational subjects showed a similarity of personality types and aptitudes to the females who were also enrolled in these vocational programs. Moreover, the results indicate that for the nontraditional male students, they selected the vocational programs based on their own abilities rather than on perceived sex appropriateness.

The similarity of aptitudes between the nontraditional males and the traditional females was found in verbal

reasoning, numerical ability, abstract reasoning, space relations, spelling and language usage. There are, however, two notable exceptions to the finding. This study was consistent with past studies in identifying some sex linked aptitudes. These sex linked aptitudes are clerical speed and accuracy, and spelling--which showed both a sex difference and a course difference.

This similarity between the nontraditional male students and their female classmates was found to some degree in the personality characteristics of the students as measured by the general occupational interest scales of the Strong Campbell Interest Inventory. Similarities were found between the nontraditional male students and their traditional female counterparts in all of the personality types except the realistic type. In the realistic type scores, there was both a sex difference ($p < .0001$) and a course difference ($p < .01$). That the realistic type should be the one to show the greatest differences is consistent with the report of the differences between men and women in the general population samples (Campbell, 1977). Campbell reports a mean score for women on this category of 45.5, and a mean score for men of 54.5. This is the greatest difference between the sexes of any of the personality type scores.

The nontraditional male students differed from the traditional males in the personality types of realistic,

investigative, artistic, and enterprising. They differed among themselves only in the realistic type. In aptitudes, the nontraditional males scored significantly higher than the traditional males in language usage and lower in space relations.

Among the three groups of nontraditional male students, significant differences were found in the aptitudes of verbal reasoning, abstract reasoning, language usage, space relations, and spelling. On measures of personality types, only the realistic type showed significant differences.

CHAPTER V

SUMMARY

Changes in the job market, changes in the ways in which the economic needs of families are met, and the awareness of the negative effects of sex stereotyping have led to attempts to reduce sex bias and stereotyping in education. In turn, this has led to changes in the laws regarding equality, and to an interest in meeting the expanding needs of women in the nontraditional vocational areas. However, very little work has been done to address the bias which limits men's choices in career selection. This study attempted to address a small part of this issue.

One purpose of this study was to determine if male students who elected nontraditional vocational subjects had aptitudes and personality types similar to the females enrolled in these same subject areas, or if their types more closely resembled those of males enrolled in traditional vocational programs. A second purpose was to identify similarities and differences among the three groups of nontraditional males (males enrolled in home economics related occupations, health occupations, and business and office programs) in aptitudes and personality types.

The primary goal of this study was to provide additional information about career choice which could be used to help remove sex linked barriers which restrict choices.

The hypotheses for the study were:

1. There will be significant differences ($p < .05$) in aptitudes, as measured by the subparts of the Differential Aptitude Test, between male students who elect nontraditional vocational subjects and male students who elect traditional vocational subjects. Specifically:

    a. Male students who elect nontraditional vocational subjects will score higher than male students who elect traditional vocational subjects ($p < .05$) in the aptitude areas of language usage and clerical speed and accuracy.

    b. Male students who elect nontraditional subjects will score lower than male students who elect traditional vocational subjects ($p < .05$) in the aptitude area of space relations.

2. Male students who elect nontraditional vocational subjects will score differently than male students who elect traditional vocational subjects ($p < .05$) on personality types, as measured by the Strong Campbell Interest Inventory.

3. There will be no significant differences in aptitude ($p < .05$) for the separate scores of the subparts of the Differential Aptitude Test, between males and females enrolled in the areas of home economics related occupations, health occupations, and business and office programs.

4. There will be no significant differences in personality scores ($p < .05$), as measured by the Strong Campbell Interest Inventory, between males and females in home economics related occupations, health occupations, and business and office programs.

5. There will be no significant differences in aptitude ($p < .05$) as measured by the subparts of the Differential Aptitude Test, among the male students who elect home economics related occupations, health occupations, and business and office programs.

6. There will be no significant differences in personality types ($p < .05$) as measured by the Strong Campbell Interest Inventory among the male students who elect home economics related occupations, health occupations, and business and office programs.

Procedures

Sample

One hundred and eighty-two high school students enrolled in vocational programs throughout New Jersey made up the sample which was tested for this study. This number included

60 male students enrolled in nontraditional subject areas: 22 in home economics related occupations, 16 in health occupations areas, and 22 in business and office programs; 58 females from these same program areas were also tested, as were 64 males enrolled in traditional vocational programs.

Data Collection Instruments

The Differential Aptitude Test (DAT) was the instrument used to measure the students' aptitudes. This standardized instrument was selected because of its ability to measure a variety of career related aptitudes. The aptitudes measured were: verbal reasoning, numerical ability, abstract reasoning, clerical speed and accuracy, space relations, spelling, and language usage. The DAT is an instrument which is widely used in the public schools for both course selection and career guidance purposes. It has been tested extensively for validity and reliability.

The Strong Campbell Interest Inventory, another standardized and highly regarded career guidance instrument, was used to measure the personality type of each student. Only one section of the SCII score report form was used for this analysis--the section on general occupational themes. The theme scores are based on the six categories of occupational interests theorized by Holland (1973) and

linked to personality types. These six categories of personality types were: realistic, intellectual, social, conventional, enterprising, and artistic.

In addition to the two standardized instruments, each student was requested to complete a background information sheet which provided demographic information.

Data Collection

The instruments were administered at each of the participating schools during regular school hours. The DAT instrument required a minimum of three hours to administer. Because of the time factor, and the differences in school scheduling practices, it was not always possible to complete all of the testing in one time block. However, when the testing could not be completed in one time period, the testing was scheduled for consecutive days. The DAT is conveniently organized into subtests to allow for consecutive day scheduling. Rest periods were used also during long testing periods to counteract the effect of the testing conditions. All of the instruments were administered by the researcher and/or the guidance personnel from each school. Written instructions were used to provide standardization of the testing process.

Data Analysis

The data were analyzed using the *t*-test and the General Linear Models procedure for unbalanced analysis of variance as outlined in the Statistical Analysis

System (SAS) computer system for data analysis.

The t-test was used to compare differences between the nontraditional and the traditional males in aptitudes and personality types, and between the nontraditional males and the traditional females on measures of aptitudes and personality types. The analysis of variance procedure was used to determine significant differences among the three subgroups of the nontraditional male students on measures of aptitude and personality types.

Findings

The results of the various analysis procedures showed that:

1. There were significant differences between male students who elected nontraditional vocational subjects and male students who elected traditional vocational subjects in aptitudes as measured by the Differential Aptitude Test in the areas of language usage and space relations, but not in clerical speed and accuracy. The nontraditional males scored higher in language usage and lower in space relations than did the traditional male students.

2. Male students who elected nontraditional vocational subjects scored differently than male students who elected traditional vocational subjects on personality types, except for the investigative type, as measured by the Strong Campbell Interest Inventory. Nontraditional

males scored significantly lower in the realistic type, and significantly higher in the social, conventional, enterprising, and artistic types.

3. There were no significant differences in aptitude for the scores of the subparts of the DAT between males and females enrolled in the areas of home economics related occupations, health occupations, and business and office programs, except in the subparts of spelling and clerical speed and accuracy. The females scored significantly higher than the males in both of these aptitudes.

4. There was no significant difference in the personality scores as measured by the SCII, between males and females in home economics related occupations, health occupations, and business and office programs, except for the realistic type. The males scored significantly higher than the females in the realistic type.

5. There were significant differences as measured by the subparts of the DAT among the male students who elected home economics related occupations, health occupations, and business and office programs, except for the aptitudes of numerical ability, and clerical speed and accuracy. The home economics students scored the highest of the three groups in verbal reasoning, abstract reasoning, space relations, spelling and language usage. The health occupations students scored the lowest of the three groups in verbal reasoning, space relations, spelling,

and language usage. The business and office students scored lowest in abstract reasoning.

6. There were no significant differences in personality types, except for the realistic type, as measured by the SCII among male students who elected home economics related occupations, health occupations, and business and office programs. For the realistic type, the home economics students had the highest scores, indicating that of the three groups, they most closely resembled the realistic personality type.

The value of previous nontraditional exposure was shown by the responses to two questions: Introductory Vocational Experience, and Previous Job Experience.

7. A greater percentage of the nontraditional male students reported having an introductory exposure to a greater variety of vocational areas than did the traditional male students--32% as compared to 14%.

8. A greater percentage (35%) of the nontraditional male students had at least one nontraditional job experience compared with 4% of the traditional male students.

9. Parental influence was not an important factor in these students' decisions to elect a nontraditional program either in relation to the role models the parents presented, or in relation to the number of years of formal education completed. However, 15% of these parents did suggest that their sons take a vocational program, indicating that they

saw positive value in vocational education.

10. Self motivation was a strong influence in these students' decisions as was indicated by the response to the question, "Who suggested that you take a vocational program?" Fifty-four percent of the non-traditional males indicated that they were the ones who had made the decision for themselves.

Implications for Education

The findings of this study have some strong implications for career guidance and program selection. The area of aptitude testing is a good example, especially since many New Jersey schools use the Differential Aptitude Test as a standard part of their testing programs. This instrument is used because of the relationship between the aptitude areas where students excel, and their occupational choices. Work done by Bennett, Seashore, and Wesman in 1950-51 and 1954-55 (Bennett, 1974) showed that:

> Job level within an occupational area was related to scores on the most relevant tests. For example, in Numerical Ability, Mechanical Reasoning, and Space Relations, engineering students were clearly best, and were followed by nondegree technical students, skilled mechanical, electrical, and building trades employees, and unskilled workers, in that logical order. (p. 125)

With this linkage between aptitude and career choice as a given basis for career guidance, the next step is to look at students' aptitudes without sex bias. If, for example, a student excels at space relations, that student might

be given information about both carpentry and clothing design regardless of the sex of the student. If, however, guidance personnel wish to take the process one step further, in an effort to provide positive support for change, they could use aptitude and personality scores to identify males who might be interested in the non-traditional areas. The specific aptitude scores which may be indicators are:

1. Language Usage--In this study, the nontraditional males had higher scores than the traditional males.

2. Space Relations--Nontraditional males had lower scores in space relations than did the traditional males.

Personality characteristics also play a role in career selection. The specific personality types which may be indicators are:

1. Realistic--The nontraditional males scored lower in this category than did the traditional males.

2. Social and Conventional--In these two categories, the nontraditional males scored higher than the traditional males.

The value of exposure to a variety of vocational areas was also shown. This lends support to those schools which provide introductory vocational programs which cycle students through a number of subject areas.

Implications for Future Research

The topic of male students in nontraditonal vocational career areas is one which is ripe for research. Very little work has been done on male students who select traditionally female career areas. There has been a wealth of research on women who prepare for nontraditional careers, but not the reverse situation. Therefore the following recommendations for further research are made.

1. A replication of the study presented here would be in order, using a larger population, or a population of health occupations students who would be more representative of the general high school population.

2. This study could also be replicated using post-high school aged subjects. During the search for subjects for this study, it was pointed out to the researcher that there were a number of older males in these career areas. For this reason it might be easier to find subjects for such a study in community colleges. A study might include reasons why older men are able to make career choices which are nontraditional with seemingly more ease than high school aged males.

3. A more in-depth look at the influence of cultural background, socioeconomic level, race, and parental influence on the career choices of males needs to be taken

as these factors relate to the selection of nontraditional careers.

4. Lastly, it is the feeling of this researcher that there might be differences in the attitudes of the nontraditional male students and those of their classmates who follow traditional career paths. Are they more highly motivated in their chosen areas than traditional students? Do they do more long-range career planning at an earlier age? Do they view themselves as pioneers or do they simply see their choices as viable means to career goals?

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APPENDICES

APPENDIX A

COVER LETTER

Cover Letter

March 3, 1981

Dear

The purpose of this letter is to enlist your cooperation in a research project which will attempt to identify some of the positive factors influencing the career choices and aptitudes of eleventh and twelfth grade male students who have elected nontraditional vocational programs. The results of this study will help to improve the career guidance and recruitment of nontraditional students.

In each school which participates the guidance department will be asked to administer a short background information sheet and two standardized instruments, the Strong Campbell Interest Inventory and the Differential Aptitude Test to eleventh and twelfth grade male students enrolled in business and office occupations, cosmetology, health occupations, and home economics related occupations; to an equal number of female students in these same subjects; and to an equal number of male students who are enrolled in traditional vocational programs. The testing materials will be provided and scored at no charge to the school. The time needed for the testing is approximately three class periods. The test results will be returned to the guidance department where the information can be used to provide additional career guidance information for each participating student.

This is a part of a doctoral dissertation to be submitted to Rutgers--The State University. The advisor for the project is Dr. Charles Drawbaugh, Professor, Department of Vocational-Technical Education. Funding is being provided by the New Jersey Department of Education, Division of Vocational-Technical Education and Career Preparation.

Because of the limited number of students in the population under study, your cooperation is important to the success of the project. Could you please return the enclosed participation reply slips as soon as possible?

Thank you.

Sincerely,

(signed)
Doris L. Dopkin
Instructor

Enclosure

Reply Sheet

_____ We will be able to participate in the research project.

We have the following number of 11th and 12th grade male students enrolled in:

_____ Business and Office Programs

_____ Health Occupations

_____ Home Economics Related Occupations

_____ Cosmetology

_____ Sorry, we will not be able to participate in the research project.

School_____

Address_____

Phone #_____

Guidance person to whom correspondence should be directed

_____

Return in the enclosed envelope by March , 1981 to:

Doris L. Dopkin
Douglass College
Rutgers University
New Brunswick, NJ 08903

APPENDIX B

SELECTION OF STUDENTS

Selection of Students

The group of students under study is 11th and 12th grade male students who elect a vocational program in business and office procedures, health occupations, home economics related occupations, or cosmetology. Please identify these students first. Then select at random an equal number of female students who have elected these same programs; and an equal number of male students in the same grades who have chosen traditionally male vocational programs, such as agriculture, trade and industry, etc. These three groups will form the total number of students from your school to be tested.

Example: Assume that you have identified the following number of male students in nontraditional programs.

Health Occupations	1
Cosmetology	0
Home Economics Related Occupations	4
Business and Office Procedures	6
Total	11

You would then select at random female students from the same programs: 1 from health occupations, 0 from cosmetology, 4 from home economics related occupations, and 6 from business and office procedures. Then randomly select 11 male students from traditional vocational areas. This would total 33 students identified for testing.

Protection of Student Identification

For the purposes of this research project it is important that the students remain anonymous. One way to do this is for you to assign each student a number. Only these numbers will be used on the data which is handed over to me. You keep a record of the names and numbers so that, if you wish, you can use the returned data for career counseling with the individual students.

However, I will still need a method of identifying the group to which each student belongs. Therefore I would like you to assign the numbers in the following manner. All students are to receive a four digit code number. The first digit will indicate sex, the second will indicate program, and the third and fourth will identify the individual students.

A. First digit -

Assign all <u>males</u> the number 1 as the first digit.
Assign all <u>females</u> the number 2 as the first digit.

B. Second digit -

Assign all <u>health occupations</u> students the number 3 as the second digit.
Assign all <u>cosmetology</u> students the number 4 as the second digit.
Assign all students in <u>home economics related occupations</u> the number 5 as the second digit.
Assign all <u>business and office procedures</u> students the number 6 as the second digit.
Assign all students from traditionally male vocational programs the number 7 as the second digit.

C. Third and fourth digit -

Assign each student his/her own two digit number which will become the third and fourth numerals in this sequence. This will also help you identify the students when their test results come back.

eg. Using the examples given above, the students identified for testing would be given the following code numbers.

The first student identified is a male in health occupations.

Sex	Program	Individual #		Code #
1	3	01	=	1301

The second student is a male in a home economics related program. His number would be

Sex	Program	Individual #		Code #
1	5	02	=	1502

The third student is also a male in a home economics related program. His number would be

Sex	Program	Individual #		Code #
1	5	03	=	1503

Each student is to be told his or her number at the time the tests are administered, and these numbers are to be used instead of names on the answer sheets.

APPENDIX C

PERMISSION FORMS

Parent Permission Form

Dear Parent or Guardian,

Your school district has been asked to participate in a research project which is being conducted through the Rutgers Graduate School of Education. The purpose of this research is to study the reasons why people select specific vocational career areas. The results of this study will be used to provide improved career guidance for students. We would like to have your son/daughter participate in this project.

Each student who participates will be asked to fill out a short questionnaire and two standardized career guidance instruments. One of these instruments is the Strong-Campbell Interest Inventory which is designed to increase one's understanding of the ways in which individual likes and dislikes fit into the world of work. The second standardized instrument is the Differential Aptitude Test which measures a person's ability to acquire specific knowledge and skills which are related to successful performance in specific vocational areas.

The testing will take place at the school at no cost to the school or the students. The instruments will be scored by computer and returned to the school where the information can be used to discuss career plans with your son or daughter.

Each participating student will be assigned a number by the school guidance department, and only the guidance faculty will have access to the names. For purposes of the research project only the test results and numbers will be used. The names will not be sent to the researcher. Students are free to withdraw from the study at any time.

Please return this signed form to the school guidance office by _____. Testing will take place on _____.

Sincerely,
(signed)
Doris L. Dopkin
Project Director

I have read the enclosed information and give

_____ permission to participate
(Student's Name)

in the described research project.

_____
(Parent's Signature)

Student Permission Form

Dear Student,

Your school is participating in a research project which is being conducted through Rutgers University. The purpose of this research is to study the reasons why people select specific vocational career areas. The results of this study will be used to provide improved career guidance for students.

Since you have elected a vocational program in your school we would like you to participate in this research. Your participation will include the filling out of a short questionnaire and two standardized career guidance instruments. One of these instruments is the Strong-Campbell Interest Inventory which is designed to increase your understanding of the ways in which your interests fit into the world of work. The second instrument is the Differential Aptitude Test which measures knowledges and skills which are important for success in specific vocational areas.

These instruments will be scored by a computer and returned to the school guidance department where you will have access to them. You may use the scores to discuss career plans with your guidance counselor.

Each participating student will be assigned a number by the school guidance department, and only the guidance faculty will have access to the names. For purposes of the research project only the test results and numbers will be used. The names will not be sent to the researcher. Students are free to withdraw from the study at any time.

Please return this signed form to the school guidance office by _____. Testing will take place on _____.

Sincerely,

(signed)
Doris L. Dopkin
Project Director

I have read the enclosed information and agree to participate in the described research project.

_____

(Student's Signature)

APPENDIX D

BACKGROUND INFORMATION SHEET

Background Information Sheet

1. Identification Number _____

2. School _____

3. Grade in School _____

4. Mother's Occupation _____

5. Father's Occupation _____

6. Mother's Education (Highest Level) _____

7. Father's Education (Highest Level) _____

8. Which of the following categories comes closest to your family income?

   a. _____ Less than $5,000
   b. _____ $5,0001-$10,000
   c. _____ $10,001-$15,000
   d. _____ $15,001-$20,000
   e. _____ $20,001-$25,000
   f. _____ $25,001 and over

9. Have you had any introductory vocational courses?
   ___yes ___no If yes, list the names of the courses here: _____

   _____

10. List the jobs you have held. _____

    _____

11. Who suggested that you take a vocational program?

    a. _____ guidance counselor
    b. _____ parent
    c. _____ friend
    d. _____ other (specify) _____

APPENDIX E

TESTING INSTRUCTIONS

Instructions for the Administering of the Instruments

1. Explain the purpose of the project.

2. Collect all permission slips--those signed by the parents and those signed by the students.

3. Explain to the students that they are free not to answer any of the questions. However, the more carefully they answer, the more complete will be the research results. Their help is appreciated.

4. Give each student his/her assigned number. (See other instruction sheet.) Have the students write both their number and the school name on each answer sheet which he/she will use.

5. Have the students fill in the background information sheet. Collect these sheets.

6. Hand out the Strong Campbell Interest Inventory booklets. Go over the directions on the booklets. Have the students fill in the answers. This should take about 30 minutes. Collect the booklets after double checking to see if each student number is on the sheets.

7. Administer the Differential Aptitude Test. Note that this test is in sections and different sections can be administered on different days depending on class schedules. The specific instructions for administering this test are attached to this sheet. Again, check to see that each student has put his/her number on the answer sheet.

8. Return the permission slips, background information sheets, answer sheets and booklets to me in the prepaid envelope.

Much Thanks!!

I will return the scores to you as soon as the testing is completed in all of the schools and the test items are all scored.